UNITED STATES PATENT AND TRADEMARK OFFICE

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10/588,404	08/03/2006	Masaki Kitahara	5259-000070/US/NP	6947

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EXAMINER
KIM, HEE-YONG

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 August 2010*.
2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14,16 and 18* is/are pending in the application.
      4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) *1-14,16 and 18* is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.
      Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
      Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
      a)☐ All   b)☐ Some * c)☐ None of:
      1.☐ Certified copies of the priority documents have been received.
      2.☐ Certified copies of the priority documents have been received in Application No. _____.
      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
      * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☐ Information Disclosure Statement(s) (PTO/SB/08)
      Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
      Paper No(s)/Mail Date. _____ .
5)☐ Notice of Informal Patent Application
6)☐ Other: _____ .

DETAILED ACTION

Response to Amendment

1.   This office action is in reply to Applicant's Response dated August 18, 2010.

2.   **Claims 15 and 17** has been cancelled.

3.   **Claims 1, 5, 7, 8, and 12** has been amended.

4.   **Claims 1-14, 16, and 18** are still pending.

Response to Arguments

5.   Rejection of **claims 15 and 17** under 35 U.S.C. 101 is withdrawn because the

claims are cancelled.

6.   Rejection of **claim 1** under 35 U.S.C. 112 second paragraph is withdrawn

because the amendment overcomes the previous rejection.

7.   Regarding **claims 1, 3-8, 10-14, 16, and 18**, applicant's argument has been fully

considered but not persuasive. Applicant argues that Puri does not teach whether or not

the frame itself is to be encoded. Examiner respectfully disagrees. Puri discloses that

there are two parts in encoding of a skipped frame - prediction by motion compensated

interpolation by other frames and encoding of prediction error (chapter 4.1). There is no

encoding needed for the prediction because decoder derives the motion vector of

skipped frame from encoded pictures (chapter 4.2). Therefore, output bitstream is

determined by whether prediction error is encoded or not. And Puri discloses conditional

encoding of prediction error depending on the significance of the prediction error

(encoding the interpolation error only if it is significant , pp.130-131).

Claim Rejections - 35 USC § 103

8.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

9.   **Claims 1, 3-8, 10-14, 16, and 18** are rejected under 35 U.S.C. 103(a) as being

unpatentable over Kimata (CIT 2004, IEEE) (hereafter referenced as Kimata), in view

of Puri (Signal Processing Image Communication 2, 1990, pp.127-144) (hereafter

referenced as Puri).

Regarding **claim 1**, Kimata discloses System Design of Free View point Video

Communication. Kimata specifically discloses A video encoding method (4. Coding

Method, pp.4- pp.5) for assigning a plurality of images (Fig.6 -7) to a plurality of GOPs

(Group of GOP (GoGop), Fig.6-7) and encoding images belonging to the GOPs as a

video image, the method comprising: *in-GOP image encoding step of encoding the*

image belonging to the relevant GOP (base GOP and Inter-GOP, Chapter 4 and Fig.7).

However, Kimata fails to discloses

GOP encoding determination step in which:

if it is determined that each image belonging to a given GOP can be generated on a

decoding side without using encoded data of a relevant image, it is determined that the

relevant image is not encoded and no encoded data thereof is output; and

if it is determined that each image belonging to the given GOP cannot be generated on

a decoding side unless encoded data of the relevant image is used, then it is

determined that the relevant image is encoded and the encoded data thereof is output;

a GOP encoding/non-encoding data encoding step of encoding GOP encoding/non-

encoding data for indicating whether encoded data of the image belonging to the

relevant GOP is output, and an in-GOP image encoding step of encoding the image

belonging to the relevant GOP when the encoded data of the image is output.

In the analogous field of endeavor, Puri discloses Video Coding with Motion –

Compensated Interpolation for CD-ROM Application. Puri specifically discloses

conditional motion compensated interpolation (CMCI) which is interpolating the skipped

frames using motion compensated interpolation based on other reference frames, but

encoding the interpolation error only if it is significant (4.Motion-Compensated

Interpolation, pp.130-131), in order to keep the additional information as small as

possible (pp.131, left col, line 9-11). So Puri teaches that if it is determined that an

image can be generated on a decoding side without using encoded data of a relevant

image (a skipped frame which has not significant interpolation error), it is determined

that the relevant image is not encoded and no encoded data thereof is output (not

encoded if prediction error is not significant); and if it is determined that an image

cannot be generated on a decoding side unless encoded data of the relevant image is

used, then it is determined that the relevant image is encoded and the encoded data

thereof is output (interpolation error is encoded if the prediction error is significant).

Kimata teaches that the interpolation of the image belonging to the relevant GOP is

done by Ray-Space method (Kimata: Ray-Space Interpolation, Fig.3 and 4) based on

other GOP's (Inter-GOP configuration of Fig.7(b)). It was obvious that Puri's selective

encoding of frame can be applied to a selective encoding of GOP in Kimata since

Kimata has GOP based structure (base GOP and Inter-GOP, Chapter 4 and Fig.7).

Therefore, given this teaching, it would have been obvious to one of ordinary skill

in the art at the time invention was made to modify Kimata by incorporating selectively

encoding the each image belonging to the relevant GOP based on the significance of

interpolation error with transmission of encoding/non-encoding information (1 bit), in

order to keep the additional information as small as possible. The Kimata coding

method, incorporating the Puri selective encoding based on the significance of

interpolation error, has all the features of claim 1.

Regarding **claim 3**, the Kimata coding method, incorporating the Puri selective

encoding based on the significance of interpolation error, further incorporating adaptive

selection of In-GOP and non-encoding based on the bandwidth limitation, as applied to

claim 1, teaches further comprising: a generation reference-GOP encoding step of

encoding generation reference-GOP designating data for designating one or more other

GOPs (Kimata: reference GOP index are defined in GOP header, pp.4, left col, last 3

lines) which are used for generating the image (Kimata: Ray-Space Interpolation, Fig.3

and 4) belonging to the relevant GOP when the encoded data of this image is not

output (No-encoding shown in above claim 1) .

Regarding **claim 4**, the Kimata coding method, incorporating the Puri selective

encoding based on the significance of interpolation error, further incorporating adaptive

selection of In-GOP and non-encoding based on the bandwidth limitation, as applied to

claim 1, teaches further comprising:

a generation data encoding step of encoding generation data (Kimata: Ray-Space

Approach used as View Generation, pp.3, left col.) for designating an image generation

method which is used for generating the image (3. Free viewpoint viewer, pp.2)

belonging to the relevant GOP (Fig.7(b). GoGOP #2 uses only decoded picture of base

GOP (GOP of Other Camera's)) when the encoded data of this image is not output

(no-encoding shown in above claim 1).

Regarding **claim 5**, The Kimata coding method, incorporating the Puri selective

encoding based on the significance of interpolation error, as applied to claim 1,

discloses A video decoding method (Kimata: Fig.8 Decoder) for decoding encoded data

generated by assigning a plurality of images (Kimata: Fig.6 -7) to a plurality of GOPs

and encoding images belonging to the GOPs (Kimata: Group of GOP (GoGop), Fig.6-7)

as a video image, the method comprising:

a GOP encoding/non-encoding data decoding step (anticipated by the combination,

because there is a bit indication encoding-non-encoding as shown above claim 1) of

decoding GOP encoding/non-encoding data for indicating whether the encoded data of

each image belonging to each GOP is to be decoded (definition of encoding/non-

encoding bit); and an in-GOP image decoding step (Fig. 8 includes in-GOP as well as

inter-GOP) in which if the GOP encoding/non-encoding data indicates that the encoded

data of a relevant image is to be decoded, the relevant image is decoded by decoding

the encoded data (Kimata:Fig.8 Decoder); and

if the GOP encoding/non-encoding data indicates that the encoded data of the relevant

image is not to be decoded (Puri: encoding the interpolation error only if it is significant,

pp.130-131), the relevant image is decoded by using an image generation method

(Kimata: Ray-Space Approach used as View Generation, pp.3, left col.)) which does

not use the encoded data of this image (does not use image taken by the concerned

camera, but uses images taken by other cameras, Fig.7).

Regarding **claim 6**, the Kimata coding method, incorporating the Puri selective

encoding based on the significance of interpolation error, as applied to claim 1, teaches

further comprising:

a generation reference-GOP decoding step of decoding generation (Kimata: Reference

Picture Determination, Fig.8) reference-GOP designating data for designating one or

more other GOPs (Kimata: reference GOP index are defined in GOP header, pp.4, left

col, last 3 lines) which are used for generating the image (Kimata: Ray-Space

Interpolation, Fig.3 and 4) belonging to the relevant GOP when the encoded data of this

image is not decoded (No-encoding shown in above claim 1, Kimata: Fig.7b shows

reference pictures only with other cameras).

Regarding **claim 7**, the Kimata coding method, incorporating the Puri selective

encoding based on the significance of interpolation error, as applied to claim 1, teaches

further comprising:

a generation data decoding step of decoding generation data for designating an

image generation method which is used for generating the image (Kimata: Ray-Space

Interpolation, Fig.3 and 4) belonging to the relevant GOP(Kimata: C2 images in Fig

7(b)) when the encoded data of this image is not decoded (no-encoding shown in above claim 1).

Regarding **claim 8**, the claimed invention is an apparatus claim corresponding to the method claim 1. Therefore, it is rejected for the same reason as claim 1.

Regarding **claim 10**, the claimed invention is an apparatus claim corresponding to the method claim 3. Therefore, it is rejected for the same reason as claim 3.

Regarding **claim 11**, the claimed invention is an apparatus claim corresponding to the method claim 4. Therefore, it is rejected for the same reason as claim 4.

Regarding **claim 12**, the claimed invention is an apparatus claim corresponding to the method claim 5. Therefore, it is rejected for the same reason as claim 5.

Regarding **claim 13**, the claimed invention is an apparatus claim corresponding to the method claim 6. Therefore, it is rejected for the same reason as claim 6.

Regarding **claim 14**, the claimed invention is an apparatus claim corresponding to the method claim 7. Therefore, it is rejected for the same reason as claim 7.

Regarding **claim 16**, the claimed invention is a computer-readable medium claim corresponding to the method claim 1. Therefore, it is rejected for the same reason as claim 1.

Regarding **claim 18**, the claimed invention is a computer-readable medium claim corresponding to the method claim 5. Therefore, it is rejected for the same reason as claim 5.

10.   **Claims 2 and 9** are rejected under 35 U.S.C. 103(a) as being unpatentable over

Kimata in view of Puri , and further in view of Eifrig (US 5,991,447) (hereafter

referenced as Eifrig).

Regarding claim 2, the Kimata coding method, incorporating the Puri selective

encoding based on the significance of interpolation error, as applied to claim 1, teaches

image generated by using one or more other GOPs without decoding the encoded data

of the relevant GOP (no-encoding, but interpolated by other GOP's using Ray-Space),

and encoding the relevant GOP.

However, the combination fails to teach the GOP encoding determination step includes

determining whether an image generated by using one or more other GOPs without

decoding the encoded data of the relevant GOP is closer to an original image of the

relevant image in comparison with an image obtained by decoding the

encoded data, so as to determine whether the image belonging to the relevant

GOP is to be encoded.

In analogous field of endeavor, Eifrig discloses Prediction and Coding of Bi-

Directionally Predicted Video Object Planes for Interlaced Video. Eifrig specifically

discloses that prediction mode is decided based on SAD (sum of absolute difference

between prediction and the current picture) (*closeness to the original picture*)

calculation of forward, backward, and averaged mode, in order to do efficient coding

(col. 14, line 16-24).

Therefore, given this teaching, it would have been obvious to one of ordinary skill

in the art at the time invention was made to modify Kimata and Puri by incorporating the

mode decision based on minimum SAD between In-GOP encoding and non-encoding of the relevant image, in order to do efficient coding. The Kimata coding method, incorporating the Puri selective encoding based on the significance of interpolation error, incorporating the mode decision based on minimum SAD between In-GOP encoding and no-encoding of the relevant image, has all the features of claim 2.

Regarding **claim 9**, the claimed invention is an apparatus claim corresponding to the method claim 2. Therefore, it is rejected for the same reason as claim 2.

Conclusion

11.   Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

12.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to HEE-YONG KIM whose telephone number is (571)270-

3669. The examiner can normally be reached on Monday-Thursday, 8:00am-5pm EST.

        If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Marsha Banks-Harold can be reached on 571-272-7905. The fax phone

number for the organization where this application or proceeding is assigned is 571-

273-8300.

        Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/HEE-YONG KIM/
Examiner, Art Unit 4192

/Andy S. Rao/
Primary Examiner, Art Unit 2621
September 30, 2010